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THE AMPHIBIOUS GROUP OF POLYGONUM, SUBGENUS PERSICARIA.

E. E. STANFORD.

(Continued from page 152.)

KEY TO THE AMPHIBIOUS PERSICARIAS OF EUROPE AND AMERICA.

Plants perennial, more or less amphibious: flowers dimorphous as to stamens; these members accordingly strongly exerted or much reduced and included; the two types usually segregated on different plants; long-stamened flowers almost invariably sterile and the short-stamened frequently so.

- a. Aquatic forms; stems floating or somewhat emersed: leaves glabrous (becoming more or less hirsute in transition-forms), elliptic or oval
 - b. Margins of leaves armed with short harsh bristles
 - 1a. *P. amphibium* f. *natans*.
 - b. Margins naked or with weak hairs or bristles
 - c. Peduncle glabrous: panicle ovoid, 1-5 cm. long
 - Panicle 1-3 cm. long: fruiting calyx not over 6 mm. long.....2a. *P. natans* f. *genuinum*.
 - Panicle 4-5 cm. long: fruiting calyx 6-7 mm. long.....2c. *P. natans* var. *insigne*.
 - c. Peduncle hairy: panicle cylindric, 3-10 cm. long
 - Leaves mostly cordate: internodes not inflated nor tapering upward.....3b. *P. coccineum* f. *natans*.
 - Leaves mostly rounded or acutish at the base: internodes inflated or tapering upward. .3c. *P. coccineum* var. *rigidulum*.

- a. Terrestrial forms; stems upright and leafy: leaves rarely glabrous, mostly more or less hairy *d*.
- d. Ocreae without herbaceous margin *e*.
- e. Leaves harshly scabrous with short (1 mm. or less) stiff hairs.....1b. *P. amphibium* f. *terrestre*.
- e. Leaves glabrous or pubescent or hirsute with weak hairs (mostly 1-2 mm. long)
Panicles mostly 4-18 cm. long: petioles mostly attached midway of the ocreae; plant usually rather densely (often minutely) pubescent or canescent
3d. *P. coccineum* var. *pratincola*.
- Panicles mostly 4-8 cm. long: petioles attached near the base of the ocreae: plant very variable as to pubescence, sometimes nearly glabrous (except the peduncle).....3a. *P. coccineum* f. *terrestre*.
- d. Ocreae with herbaceous margins.....2c. *P. natans* f. *Hartwrightii*.

1. POLYGONUM AMPHIBIUM L. Sp. Pl. 361 (1753). Perennial; aquatic, emersed, or terrestrial.

1a. Forma **natans** (Moench), comb. nov. Stems rhizomatiform, floating, submerged, or on the bottom of ponds, lakes, etc., becoming erect as the plant passes to the forma *terrestre*, rooting at the somewhat constricted nodes; internodes 5-10 cm. long.

Leaves floating, elliptic-lanceolate, 2-4 cm. wide, 8-12 cm. long, coriaceous, glabrous on both surfaces, shining above; base acute and slightly inequilateral, rounded, truncate, or slightly cordate; apex acute or obtuse when young, becoming obtuse; margin entire or slightly undulate, usually armed with short stout appressed bristles and harsh to the touch, rarely naked; lateral veins of mature leaves nearly straight and meeting the mid-vein nearly at right angles; petioles 3-8 cm. long, slender, flexuous, flattened, attached at the central or upper portion of the ocrea.

Ocreae 1-2 cm. long, thin-membranous, glabrous, rounded-truncate, eciliate.

Inflorescence erect, usually single, occasionally with subordinate branches: peduncle glabrous: panicle dense-flowered, cylindric, 1-5 cm. long: ocreolae 3-4 mm. long, thin-membranous, inconspicuous, rounded-rhombic or deltoid: fascicles 2-3-flowered, the bracts persistent, thin-membranous: flowers heterostyled, the types usually on separate plants; pedicels mostly 1 mm. long or less.

Long-styled flowers. Calyx pink or rose, 3-4 mm. long, 5-parted to about $\frac{3}{4}$ its length; the segments rounded, narrow-ovate: calyx opening briefly, becoming slightly accrescent and flattened-ovoid in fruit: stamens 5, much reduced, about 1.5 mm. long; anthers shrunken, nearly or quite devoid of pollen: style 3.5-4 mm. long, two-parted to below the middle; the lobes exserted about 1 mm. and diverging: stigmas capitate: nectaries 5, below and alternating with the filaments.

Short-styled flowers. Opening more widely: stamens 3.5-4.5 mm. long, strongly exserted; anthers usually fully polliniferous: ovary reduced: style 3 mm. long, its tips with the flattened-capitate stigmas slightly exserted: pollen usually normal.

Achene 2–2.2 mm. wide, 2.5–3 mm. long, nearly orbicular, much exceeded by the calyx, minutely protuberant at base, thick-lenticular, minutely roughened and rather dull.

P. amphibium var. *natans* Moench, Enum. Pl. Hassk. 28 (1777), not *P. amphibium* Michx. and Am. authors.

Widespread in slow waters throughout Europe.

1b. Forma TERRESTRE (Leers) Moss. Camb. Brit. Fl. ii. 115 (1914).

Emersed or growing on margins of ponds, rivers, or wet places, more rarely in dry localities. Branches upright from a repent or rhizomatiform stem, often appearing on extensions of an aquatic stem in shallow water or on banks; internodes 4–5 cm. long.

Leaves lanceolate, 1–3 cm. wide, 10–18 cm. long, subcoriaceous; upper surface and margin scabrous with close appressed short (1 mm. or less) stiff sharp bristles; lower surface less scabrous with weaker bristles; bases cuneate, rounded, or narrowly cordate; apex long-attenuate; leaves borne at an acute angle on a short (0.5–1 cm.) stiff petiole from near the top of the ocrea.

Ocreae 1.5–2.5 cm. long, closely cylindrical, wrinkled, minutely strigose; the margin above the attachment of the petiole scarious and tending to disappear in part, leaving the vascular bundles projecting like cilia: ocreae sometimes adherent to or coalescent with the epidermis.

Inflorescence (rarely produced and then mostly sterile) usually a single terminal panicle, sometimes with subordinate branches: peduncles minutely hairy: the hairs often with inconspicuous glandular tips.

Polygonum amphibium var. *terrestre* Leers, Fl. Herborn. 98 (1775) and of European authors; not of S. F. Blake, RHODORA, xv. 164 (1913), which is *P. natans*, forma *Hartwrightii*. *Persicaria amphibia* var. *terrestre* S. F. Gray, Nat. Arr. Brit. Pl. ii. 268 (1821).

Emersed or terrestrial, common throughout Europe. A single introduction known in North America, which is represented by the following: NOVA SCOTIA: roadside bank in rubbish near railroad, Yarmouth, September 1, 1920, *Bissell, Long & Linder*, no. 21,064.

2. *P. NATANS* A. Eaton, Man. Bot. ed. 3: 400 (1822). Perennial: aquatic, emersed, or terrestrial.

2a. Forma **genuinum**. Stems floating or more or less submersed and rooting at the bottom, becoming erect and passing into the forma *Hartwrightii* in shallow water, rhizomatiform, 0.5–0.7 cm. in diameter; nodes slightly swollen; internodes 5–10 cm. long.

Leaves elliptic or elliptic-oval, becoming lanceolate as the plant approaches the forma *Hartwrightii*, 2–4 cm. wide, 7–12 cm. long, thinly coriaceous, glabrous on both surfaces, shining above, often reddened; base rounded, or somewhat inequilaterally acute at the junction with the petiole; apex rounded, more rarely acute; margin entire, usually unarmed, becoming weakly scabrous with short appressed hairs in transition forms; side veins of mature leaves meeting the midvein at an angle of about 60° and curving toward

the margin: petioles slender, flexuous, flattened, 1–6 cm. long, attached to the upper portion of the ocrea.

Ocreae thin-scarious, close-cylindric, obliquely truncate; the margin scarious or in transition forms becoming herbaceous.

Inflorescence erect, usually a single panicle, or occasionally with the peduncle giving off inferior branches below; peduncle glabrous, 5–6 cm. long, much ridged in drying: panicle 1–3 cm. long, ovoid or short-cylindric, dense-flowered: ocreolae 3–4 mm. long, elongate-triangular and acute, thin-membranous, inconspicuous: flowers heterostyled, the types usually segregated on separate plants.

Long-styled flowers. Calyx pink or reddish, 3–4 mm. long and narrow-ovoid, becoming slightly longer and broader-ovoid in fruit, 5-parted to below the middle; the lobes rounded: stamens 5, usually much reduced, 1–2 mm. long; anthers shrunken and mostly devoid of pollen, included: style 3–4 mm. long, 2-parted nearly to the middle; the branches exerted and diverging; stigmas capitate: nectaries 5, alternating with and below the attachment of the filaments.

Short-styled flowers. Opening more widely and more or less permanently: stamens 4–6.5 mm. long, strongly exerted: anthers fully polliniferous and soon deciduous: ovary reduced, rarely or never developing further: style 3–3.2 mm. long: the branches and stigmas exerted but usually less so than the stamens: pollen usually with a considerable proportion of defective grains.

Achene 2.5–2.7 mm. wide, 2.5–2.7 mm. long, nearly orbicular, thick-lenticular, minutely pitted and rather dull; the faces strongly convexed; the base slightly constricted or disciform.

Polygonum natans A. Eaton, Man. Bot. ed. 3: 400 (1822), ed. 4: 404 (1824), ed. 5: 338 (1829). *P. fluitans* Eaton, Man. ed. 6: 274 (1833), ed. 7: 450 (1836); Eaton & Wright, N. A. Bot. 368 (1840). *P. coccineum* Bigelow, Fl. Bost. ed. 2: 157 (1824); not Muhl. in Willd. Enum. Hort. Berol. 1809). *P. amphibium* var. *natans* Michaux, Fl. Bor. Am. i. 240 (1803); Meisner, Monog. Gen. Polyg. Prodr. 67 (1826); Hooker, Fl. Bor.-Am. ii. 131 (1838); Wood, Cl. Bk. Bot. 324 (1845); not Moench, Enum. Pl. Hass. 28 (1775). *P. amphibium* var. *aquaticum* Torrey, Fl. No. & Mid. U. S. i. 404 (1824) and Comp. Fl. No. & Mid. States 172 (1826); Beck, Bot. N. & Mid. States, 30 (1833); Gray, Man. 388 (1848), ed. 5: 416 (1867); Wood, Cl. Bk. Bot. 609 (1880); not Leysser, Fl. Hals. ed. alt. 95 (1783). *P. amphibium* Small, Monog. N. A. Polyg. 40, t. 7 (1895); Robinson & Fernald in Gray, Man. ed. 7: 360 (1908); and many other Am. authors, not L. Sp. Pl. 361 (1753). *Persicaria fluitans* (Eaton) Greene, Leaflets, i. 26 (1904). *P. plattensis* Greene, loc. cit. 29 (1904). *P. oregana* Greene and *P. lactevirens* Greene, loc. cit. 31 (1904). Probably including others of Greene's species of which types have not been available.

In pools and slow waters, Newfoundland, Prince Edward Island, Magdalen Islands, Nova Scotia, Quebec, southward to Pennsylvania

and across the continent; in the Pacific States southward to and throughout California.

The following are characteristic. NEWFOUNDLAND: sandy and gravelly shores of ponds, headwaters of Rocky River, Avalon Peninsula, *Fernald & Wiegand*, no. 5369; shallow pool near river, Bishop Falls, *Fernald & Wiegand*, no. 5348; shallow water near margin of Rushy Pond, *Fernald & Wiegand*, no. 5350. QUEBEC: dried-up swampy hole, mouth of Grand River, Gaspé County, *Collins, Fernald & Pease*, no. 5271. MAGDALEN ISLANDS: edge of pond in sand dunes, Brion Island, *St. John*, no. 1861. PRINCE EDWARD ISLAND: shallow border of Cousin's Pond, Malpeque, *Fernald & St. John*, no. 200. NOVA SCOTIA: beach of Shubenacadie Grand Lake, Halifax Co., *Fernald, Bartram & Long*, no. 23,791; in water of marsh, near Pictou, *Howe & Lang*, no. 474; in Plaster-hole Lake, vicinity of Dingwall, *Nichols*, no. 1036. MAINE: Pettiquaggamas (Glazier) Lake, Aroostook Co., *Fernald*, no. 95; Lake Christopher, Woodstock, July, 1887, *Parlin*. VERMONT: Walden, July 4, 1894, *Eggleston*; Castleton, October 3, 1897, *Eggleston*. MASSACHUSETTS: Hinsdale, *S. F. Poole*, no. 288. CONNECTICUT: Southington, *Bissell*, no. 503; Crescent Lake, *Luman Andrews*, no. 7; Flanders Pond, *Andrews*, no. 2; Beaver Pond, Meriden, *Andrews*, no. 17. NEW YORK: Pool northeast of Spencer Lake, Spencer, Tioga Co., *Eames*, no. 3993; partly dried-out soil, Slaterville Swamp, Caroline, Tompkins Co., *Wiegand*, no. 11,972; in water, Chicago Bog, Cortland, Cortland Co., *Eames & Macdaniels*, no. 407; Racquette River, *C. S. Phelps*, no. 398. MINNESOTA: Oshawa, Nicollet Co., July, 1892, *C. A. Ballard*. IOWA: Kossuth County, *Cratty & Pammel*, no. 609. NORTH DAKOTA: Dickinson, September 10, 1908, *W. H. Holgate*. ALBERTA: near Banff, *Macoun*, no. 1481; prairie ponds, Elbow River District, vicinity of Calgary, *M. E. Moodie*, no. 1061. SASKATCHEWAN: *E. Bourgeau*, 1857-8. MONTANA: Hound Creek, *Scribner*, no. 237; Flathead, *MacDougal*, no. 461; Cliff Lake, alt. 7000 ft., *Rydberg & Bessey*, no. 5358. WYOMING: Two Ocean Lake, *Merrill & Wilcox*, no. 1095; bogs, Dunn's Ranch, Albany County, *A. Nelson*, no. 7465. COLORADO: Gunnison, alt. 7680 feet, *Baker*, no. 906. IDAHO: trailing, in marshes, Falk's Store, Canyon Co., *Macbride*, no. 291; shallow water, St. Anthony, *Merrill & Wilcox*, no. 848. NEVADA: Lake Washoe, *J. Torrey*, no. 427. CALIFORNIA: borders of ponds, Bear Valley, San Bernardino Mts., *Parish*, no. 1405a; Donner Lake, Nevada Co., *Heller*, no. 7162; Cuyamaca Lake, *Abrams*, no. 3846. OREGON: Klamath Marsh, alt. 1530 m., *Leiberg*, no. 628; tule of Grande Ronde, *Cusick*, no. 1763; near Ashland, *Applegate*, no. 604; lower Albina, Portland, *Sheldon*, no. 11,327. WASHINGTON: Calispel Valley, *Kreager*, no. 338.

The above were mostly distributed as *P. amphibium*.

2b. Forma **Hartwrightii** (Gray), comb. nov. More or less erect from a rhizomatiform stem; the upright stems much branched and leafy, with a variable degree of pubescence or hirsuteness.

Leaves lanceolate, 1–4 cm. wide, 10–15 cm. long, herbaceous, opaque, often glabrous except near the margin, or more or less densely clothed (in the less hairy forms near the margin chiefly) with weak slender flexuous hairs 1–2 mm. long, and rising from somewhat expanded bases; bases rounded or slightly cordate; apex acute or attenuate; margin entire, clothed with slender or slightly harsh hairs; petioles very short (usually 0.5 cm. or less), stout, attached to the middle or lower half of the ocrea.

Ocreae close-cylindric, firmly membranous, 1–2.5 cm. long, wrinkled, hirsute; margins salver-form, herbaceous, and more or less reflexed, about 1 cm. in diameter; the salver-form appendage occasionally wanting.

Inflorescence (rare and usually sterile) mostly terminal.

Polygonum Hartwrightii Gray, Proc. Am. Acad. viii. 294 (1870); Watson, Bot. Calif. ii. 14 (1880); Watson & Coulter in Gray, Man. ed. 6: 441 (1890); Small, Monog. N. A. Polyg. 42, t. 8 (1895); Britton & Brown, Ill. Fl. i. 555 (1896). *Polygonum amphibium* var. *Hartwrightii* Bissell, RHODORA iv. 104 (1902); Robinson & Fernald in Gray, Man. ed. 7: 361 (1908). *Polygonum amphibium* forma *Hartwrightii* (Gray) Blake, RHODORA xv. 164 (1913). *Polygonum amphibium* forma *terrestre* Blake, loc. cit. (1913); Farwell, Ann. Rept. Mich. Acad. Sci. xxi. 365 (1920); not Moss, Camb. Brit. Fl. ii. 115 (1914). *Polygonum amphibium* var. *marginatum* Farwell, Ann. Rept. Mich. Acad. Sci. xxi. 365 (1920). *P. amphibium* var. *marginatum* forma *Hartwrightii* Farwell, loc. cit. (1920). *P. amphibium* var. *marginatum* forma *hirtuosum* Farwell in Papers Mich. Acad. Sci. i. 93 (1923). *Persicaria Hartwrightii* (Gray) Greene, Leaflets i. 24 (1904); probably also *P. abscissa*, *P. asclepiadea*, *P. nebrascensis*, *P. ammophila*, *P. muriculata*, *P. homalostachya*, *P. villosula* and *P. chelanica* Greene, loc. cit., p. 17–50, and *P. carictorum* Nwd. Am. Midl. Nat. ii. 230 (1912).

In swamps, wet places, and sometimes in dry prairies throughout the range of the forma *genuinum*; apparently replacing it, or at least more conspicuous, throughout the middle west and in the Mississippi valley. The following are characteristic. NEWFOUNDLAND: stranded on wet sandy shore of Rushy Pond, Fernald & Wiegand, no. 5351. QUEBEC: vicinity of Longueuil, emersed, Victorin, no. 4263; mouth of Grand River, Gaspé County, August 11–15, 1904, Collins, Fernald & Pease. MAGDALEN ISLANDS: edge of pond in sand dunes, Brion I., St. John, no. 1860. PRINCE EDWARD ISLAND: swale near margin of North Lake, Kings Co., Fernald, Long & St. John, no. 7382; swampy margin of Cozen's Pond, Fernald & St. John, no. 11,048. Lower Sea Cow Pond, Fernald & St. John, no. 7380. MAINE: wet thicket, Dover, September 11, 1894, Fernald; river bank, Van Buren, September 18, 1900, Fernald. VERMONT: Perch Pond, Pownal, Eggleston, no. 329. MASSACHUSETTS: Fresh Pond, Cambridge, September, 1878, Farlow. CONNECTICUT: Beaver Pond, Meriden, Luman Andrews,

no. 17; Shuttle Meadow Lake, Southington, *Andrews*, no. 8. ONTARIO: marshes, Point Edward, *J. Macoun*, no. 54,744. NEW YORK: a series of sheets by *S. H. Wright*, Dundee, Yates Co., and no doubt the Gray types; Lowery's Pond, Junius, *Metcalf*, no. 6459. INDIANA: swamp land, Wolf Lake, *Smith*, no. 5729. MICHIGAN: banks of Indian River, Cheboygan Co., August 12, 1890, *C. F. Wheeler*. WISCONSIN: Green Bay, August 16, 1899, *J. H. Schuette*. ILLINOIS: drained swamp near Wady Petra, *Chase*, no. 191; Fountaindale, *Bebb*. MINNESOTA: Center City, August, 1892, *B. E. Taylor*. IOWA: Ames, August 8, 1874, *C. E. Bessey*. NEBRASKA: 3 mi. northwest of Whitman, *Rydberg*, no. 1293. COLORADO: swampy river bottom, Bedrock, Montrose Co., *Walker*, no. 371. MONTANA: banks of Missouri River, alt. 3100 feet, *Scribner*, no. 238 (as *P. Muhlenbergii*). IDAHO: Priest Lake, *Piper*, no. 3717. UTAH: Rabbit Valley, alt. 6700 feet, *Ward*, no. 617. LOWER CALIFORNIA: Cantillas Mts., *Orcutt*, no. 898.

The above were mostly distributed as *P. Hartwrightii* and *P. amphibium*.

2c. Var. **insigne** (Greene), comb. nov. An extremely robust variety, seen only in the aquatic form. Leaves 3–5 cm. wide, 6–12 cm. long; the lower cordate at the base: panicles 2 cm. thick, 4–5 cm. long: fruiting calyx 3 mm. wide, 7 mm. long: achene scarcely larger than in the type; style-base notably stiff, breaking to leave the achene with a spine-like point: pollen somewhat defective.

Persicaria insignis Greene, Leaflets, i. 32 (1904).

California. The following are typical. CALIFORNIA: aquatic, subalpine, 9180 ft. alt., September 20, 1889, locality not stated, *Wright*; near Lake Tahoe in water ("this variety is common on the eastern slope of the Sierras but very rare west of the crest"), August 29, 1863, *Brewer* no. 2156.

3. POLYGONUM COCCINEUM Muhl. in Willd. Enum. Hort. Berol. i. 428 (1809). Perennial; aquatic, emersed, or terrestrial, the latter states the more common.

3a. Forma **terrestre** (Willd.), comb. nov. Emersed or terrestrial: stem becoming erect from a more or less repent or rhizomatiform base, coarse, 1–1.5 m. high, striate, much branched, and leafy, mostly glabrous below, becoming pubescent or clothed with simple or glandular hairs above; nodes much swollen; internodes 4–10 cm. long.

Leaves lanceolate or ovate-lanceolate, 3–6 cm. wide, 10–18 cm. long, herbaceous, subcoriaceous or coriaceous; base rounded, slightly cordate or sometimes cuneate; apex acute or acuminate; margin entire, scabrous with minute appressed bristles; surfaces glabrous with minute bristle-teeth on veins on emersed plants, becoming hairy in varying degrees in those of terrestrial habitat; lateral veins forming an angle of about 60° with the midvein and curving toward the margin; petioles stout, 3–6 cm. long, attached near the base of the ocrea.

Ocreae 2–3.5 cm. long, thin-membranous, appearing inflated at the node, close-cylindric above, sometimes becoming coalescent with

the epidermis, fine-pubescent or hirsute; margin truncate, entire or short-ciliate.

Inflorescence usually terminal, erect: panicle single or more than one, with the lower smaller: peduncles 3–7 cm. long, stout, pubescent with appressed or glandular hairs, or the two mixed: panicles close-cylindric, spicate, 3–10 cm. long.

Ocreolae 3–4 mm. long, rather crowded, brown or reddish, acute, hirsute and fringed with rather stiff appressed hairs: bracts persistent, thin-membranous: fascicles 3–4 flowered: pedicels 1–2 mm. long, scarcely exerted.

Flowers scarlet or pink, heterostyled; the types usually segregated on different plants; the long-styled panicles usually with a low percentage of achene-production; short-styled almost invariably sterile.

Long-styled flowers. Calyx 5-parted, 3–3.5 mm. long, becoming 4–5 mm. in fruit, mostly narrow-ovoid and closed, or opening briefly: stamens 5, 1.5–2 mm. long; anthers reduced and mostly empty: style 3.5–4 mm. long, 2-parted to below the middle, the tips with the capitate stigmas strongly exerted (about 2 mm.): nectaries prominent, alternating with and below the filaments.

Short-styled flowers. Stamens 4–5 mm. long, exerted nearly half their length; anthers usually fully polliniferous (sometimes scantily so); pollen usually with a considerable percentage of defective grains: style 2.5–3 mm. long, exerted.

Achene 2.5–3.3 mm. long, 2.5–3 mm. wide, thick-lenticular, orbicular or broader toward the top, tapering or slightly disciform at base, minutely roughened, opaque, much exceeded by the accrescent calyx.

P. coccineum Muhl. l. c. (1809) and Cat. 40 (1813); Pursh, Fl. Amer. Sept. i. 271 (1814); Nuttall, Gen. N. A. Pl. 255 (1817); A. Eaton, Man. Bot. ed. 2: 259 (1818); Eaton & Wright, N. A. Bot. 368 (1840); Barton, Comp. Fl. Phila. i. 188 (1818); Sprengel, Syst. ii. 259 (1825). *P. coccineum* var. *terrestre* Willd. Enum. Hort. Berol. i. 428 (1809); Pursh, loc. cit. *P. amphibium* Michx. Fl. Bor.-Am. i. 240 (1803), in part; Bigelow, Fl. Bost. ed. 2: 157 (1824); Wood, Cl. Bk. Bot. 324 (1845); Darlington, Fl. Cestr. ed. 3: 246 (1853); not L. Sp. Pl. i. 361 (1753). *P. amphibium* var. *emersum* Michx. loc. cit. (1803). *P. amphibium* var. *terrestre* Torr. Fl. N. & Mid. St. i. 403 (1824); Comp. Fl. No. & Mid. St. 172 (1826); Fl. N. Y. ii. 148 (1843); Meisner, Monog. Gen. Polyg. Prodr. 67 (1828); Darlington, Fl. Cestr. 250 (1837); Hooker, Fl. Bor.-Am. ii. 131 (1839); Gray, Man. 388 (1848); ed. 5: 416 (1867); not Leers, Fl. Herb. 99 (1775). *P. amphibium* var. *Muhlenbergii* Meisner in DC. Prodr. xiv. 116 (1856). *P. amphibium* var. *longispicatum* Peck Ann. Rept. State Bot. N. Y. 1892: 48 (1893). *P. amphibium* var. *coccineum* (Muhl.) Farwell, Ann. Rept. Mich. Acad. Sci. 6: 206 (1904). *P. Muhlenbergii* (Meisn.) Watson, Proc. Am. Acad. xiv. 295 (1879); Watson & Coulter in Gray, Man. ed. 6: 441 (1890); Robinson & Fernald in Gray Man.

ed. 7: 361 (1908). *P. emersum* (Michx.) Britton. Trans. N. Y. Acad. Sci. viii. 73 (1889); Small, Monog. N. A. Polyg. 44 (1895). *P. terrestre* BSP. Prelim. Cat. N. Y. 46 (1888). *Persicaria emersa* (Michx.) Small, Fl. Se. U. S. 376 (1903). *P. coccinea* (Muhl.) Greene, Leaf. i. 24 (1904); Rydberg, Fl. Rocky Mts. 236 (1917). *P. Muhlenbergii* (Meisn.) Small in Rydberg, Fl. Colo. 11 (1906). *P. novae-angliae* Greene, loc. cit. 34 (1904) and probably others of Greene's species of which types are not available.

The following are referred here. QUEBEC: terrains submergés au printemps, Ile Plate, près de Longueuil, *Victorin*, no. 15,777. NOVA SCOTIA: rocky swale bordering Dominick Lake east of Springhaven, *Fernald & Long*, no. 23,793; wet savannah bordering Butler's (Gavelton) Lake, Gavelton, *Fernald & Long*, no. 21,065. MAINE: muddy shore, Orono, September 4, 1893, *Fernald*. MASSACHUSETTS: Small pond at Cataumet, September 15, 1901, *E. F. Williams*; edge of Charles River, in mud and water, Dedham, September 5, 1898, *F. G. Floyd*. CONNECTICUT: Misery Swamp, Southington, *Andrews* no. 1 (in part); East Hartford, September 29, 1902, *A. W. Driggs*. NEW YORK: outlet of Crooked Lake, in dry places as well as muddy, *S. H. Wright*; western central New York, *A. Gray*; Cayuga Marshes, north of R. R. bridge, Seneca Falls, *Thomas*, no. 3994; pool near Fleming Schoolhouse, Ithaca, *Wiegand & Thomas*, no. 2234. NEW JERSEY: swamp near Rosenkranz Ferry, Sussex Co., September 13, 1921, *E. B. Bartram*. PENNSYLVANIA: South river shore, Haines, Lancaster Co., September 1, 1909, *Van Pelt*; in Catskill formation, about Long Pond, Luzerne Co., *Heller & Hallbach*, no. 666. VIRGINIA: Hunting Creek Marsh, Alexandria, *Shull*, no. 236. ONTARIO: swamp, Peele Island, August 21, 1914, *MacDaniels & Eames*. MICHIGAN: wet sandy border of Douglas Lake, Cheboygan Co., *Ehlers*, no. 234. OHIO: Oxford, Erie Co., September 2, 1895, *E. L. Moseley*. ILLINOIS: wet soil, Skokie Marsh, Glencoe, August 26, 1911, *E. E. Sherff*. IOWA: Ames, *E. Johnson*, no. 622. ARKANSAS: Hornersville, *Metcalf*, no. 642. ALBERTA: prairie slough, Castle Hill District, *Moodie*, no. 1144. MONTANA: Bitter-root valley, near Frenchtown, *S. Watson*, no. 342. CALIFORNIA: small pond north of Napa, *Suksdorf*, no. 723; Los Angeles. July, 1879, *Nevin*. OREGON: swamps, Swan Lake, Klamath Co., *Applegate*, no. 603; tules of Grande Ronde, *Cusick*, no. 1764. WASHINGTON: White Salmon, *Suksdorf*, no. 481.

3b. Forma **natans** (Wiegand), comb. nov. Stems floating or more or less submerged and rooting at the bottom: leaves 4–7 cm. wide, 10–15 cm. long, coriaceous or subcoriaceous, glabrous or glabrescent, ovate-lanceolate or lanceolate, cordate or rounded at base, acute (rarely obtuse); margins and ocreae eciliate; peduncles usually glandular-hairy. The specimens seen mostly sterile.

Polygonum coccineum var. *aquaticum* Willd. Enum. Hort. Berol. 428 (1809). *P. Muhlenbergii* forma *natans* Wiegand, RHODORA, xxvi. 3 (1924). Descriptions in literature cited under the forma

terrestre are usually broad enough to include this form. *Persicaria plattensis* Greene, Leaflets i. 29 (1904) in part; *P. alismaefolia* Greene, loc. cit. and probably other species there described, the types of which have not been seen and the descriptions of which do not justify definite disposal.

Occasional throughout the range of the typical form, but much less common, particularly in the region of the upper Mississippi basin. The following specimens are typical. QUEBEC: in dried pool, vicinity of Longueuil, *Victorin*, no. 4264. MAINE: Lake Christopher, Woodstock, 1887, *Parlin*. MASSACHUSETTS: Water Shop Pond, Springfield, *Andrews*, no. 6; Readville, *C. E. Faxon*. CONNECTICUT: Middlefield, August 22, 1907, *Andrews*; Misery Swamp, Southington, *Andrews*, no. 1 in part; Sleeper Pond, *Andrews*, no. 16; Boody Pond, *Andrews*, no. 18. Lake Saltonstall, New Haven, *D. C. Eaton*; East Hartford, September 13, 1897, *A. W. Driggs*. NEW YORK: western N. Y., *A. Gray*. WISCONSIN: Namekagon River, August 30, 1831, *Houghton*. SOUTH DAKOTA: vicinity of Brookings, July 9, 1896, *T. A. Williams*. WYOMING: ponds along river, Dunn's Ranch, Albany County, *A. Nelson*, no. 7598; Fairbanks, *A. Nelson*, no. 551. COLORADO: ponds, alt. 8000 feet, Tabogauche Basin, *Payson*, no. 173. CALIFORNIA: muddy bottomland, Owens River, Inyo Co. (eaten greedily by hogs), August, 1906, *S. P. Rexford*; banks of Russian River north of Cloverdale, Mendocino Co., *Heller*, no. 5283; about Mendocino, *Brewer*, no. 931. OREGON: standing water on Sauvies Island, Multnomah Co., *J. C. Nelson*, no. 4443; wet meadows, Union Co., *Cusick*, 1878. WASHINGTON: Seattle, from *Herb. Young Naturalist's Soc.*; Pend Oreille River, *Dr. Lyall*.

The above were distributed as *P. Muhlenbergii*, *P. emersum* and *P. amphibium*.

3c. Var. **rigidulum** (Sheldon), comb. nov. An aquatic and emersed form; internodes of floating stems much swollen, 0.5–1.5 cm. in diameter and 10–15 cm. long; the nodes constricted; emersed portions with the nodes more or less swollen and the internodes tapering upward: leaves sharply lanceolate, very glabrous, or the upper becoming minutely but densely pubescent; bases rounded, rather inequilateral; petioles 5–10 cm. long, attached near the base of the ocrea; ocreae 1–5 cm. long, nearly glabrous, often coalescent with the epidermis; peduncle and ocreae minutely and densely glandular-hairy.

Polygonum rigidulum Sheldon, Bul. Geol. Nat. Hist. Surv. Minn. ix. 14 (1894). *Persicaria rigidula* (Sheldon) Greene, Leaflets i. 39 (1904); Nieuwland, Am. Mid. Nat. ii. 225 (1912). Ontario, Minnesota and South Dakota.

The following are referred here. ONTARIO: Massacre, *Macmillan & Sheldon*, no. 2407 (as *P. Muhlenbergii*). MINNESOTA: "From type coll." Nicollet, Nicollet Co., July, 1892, *C. A. Ballard*.

3d. Var. **pratincola** (Greene), comb. nov. Terrestrial, more or less minutely canescent or pubescent with weak simple or simple and

glandular hairs: petioles mostly attached midway of the ocreae: ocreae mostly sharply acute and densely hairy: panicles narrowly cylindrical and averaging somewhat longer than the type, the long-styled with a somewhat greater percentage of fertility than is usually found in the type; pollen of short-styled flowers mostly normal.

Persicaria pratincola Greene, Leaflets. i. 36 (1904). *P. spectabilis* Greene and *P. aboriginum* Greene, loc. cit. 37-44, and probably others of Greene's species of which types are not available. Indiana to the Dakotas, south to Texas and Mexico, in swamps or sand.

The following are referred here. INDIANA: Gibson, *Lansing*, no. 2831. WISCONSIN: Lapham. ILLINOIS: sand-dunes, Havana, August 12, 1893, *Gleason*. MINNESOTA: Lindstrom, Chicago Co., August, 1892, *Taylor*; near Moorhead, Red River Valley, *Ballard*, no. 2951. MISSOURI: low sandy bottoms, common, Jackson Co., *Bush*, no. 328; low prairie, Dodson, *Bush*, no. 4150; rich bottom, Sibley, *Bush*, no. 4176. NORTH DAKOTA: swamps, Leeds, August 7, 1899, *J. Lunell*; Fort Pembina, 1876, *Havard*. SOUTH DAKOTA: vicinity of Brookings, July 12, 1891, *Williams*. NEBRASKA: 3 miles northeast of Whitman, in dry lake, *Rydberg*, no. 1613; Kennedy, August 20, 1910, *Bates*. OKLAHOMA: Perkins, Payne Co., August 28, 1895, *J. W. Blankinship*; edge of pond, Copan, Washington Co., *Stevens*, no. 2104; Arkansas River, Creek Nation, August 22, 1895, *J. H. Kimmons*. TEXAS: *Wright*. MEXICO: Oaxaca, *Deam*, no. 16; Toluca, *Holway*, no. 3173.

WESTERN RESERVE UNIVERSITY.

BIDENS HYPERBOREA AND ITS VARIETIES.

NORMAN C. FASSETT.

SIMILAR to *Bidens Eatoni* Fernald in its habitat, but more northern in its range, is *B. hyperborea* Greene. This species is confined to estuaries from James Bay to northeastern Massachusetts. *B. Eatoni* has been found only on the mouths of the larger rivers: the Hudson, the Quinnipiac, the Taunton, the Merrimac, and the Kennebec with its near neighbor the Sheepscot. *B. hyperborea*, on the other hand, is to be expected on the tidal shores of almost every fair-sized stream from the Merrimac to the St. Lawrence River, except in the Bay of Fundy and on the Atlantic coast of Nova Scotia.

Bidens hyperborea belongs to a group of three species which are characterized by having simple leaves and achenes with a convex cartilaginous summit. The characters pointed out by Professor Fernald in RHODORA xxiv. 206 (1922), differentiating this species